

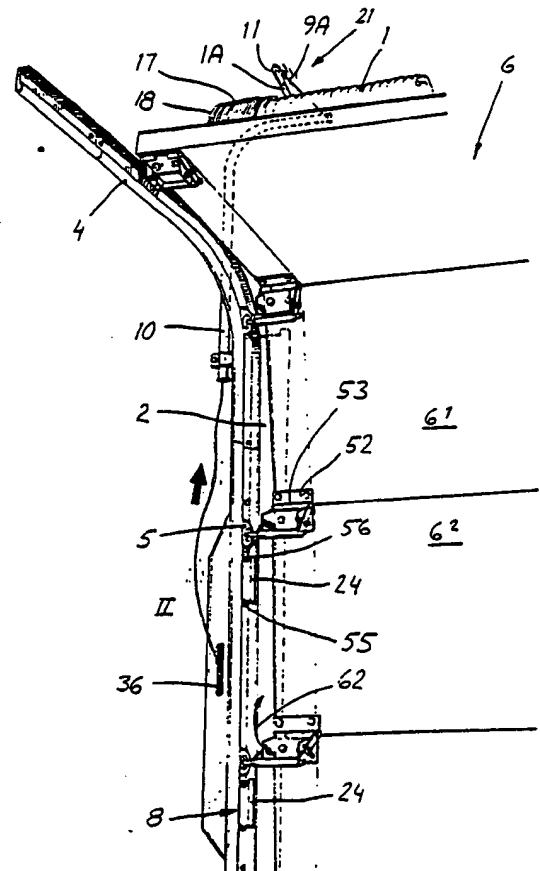
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| (51) International Patent Classification ⁴ : E05D 13/00 | A1 | (11) International Publication Number: WO 88/ 01002 (43) International Publication Date: 11 February 1988 (11.02.88) |
| <p>(21) International Application Number: PCT/SE87/00351</p> <p>(22) International Filing Date: 5 August 1987 (05.08.87)</p> <p>(31) Priority Application Number: 8603341-2</p> <p>(32) Priority Date: 7 August 1986 (07.08.86)</p> <p>(33) Priority Country: SE</p> <p>(71) Applicant (for all designated States except US): CRAWFORD DOOR PRODUCTION AB [SE/SE]; Box 160, S-423 01 Torslanda (SE).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only) : BENGTSSON, Fred [SE/SE]; Kyrkås trappor 3, S-433 31 Partille (SE).</p> <p>(74) Agent: LINDBERG, Bo; Cederbom & Lindberg AB, Box 53252, S-400 16 Göteborg (SE).</p> | | <p>(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BG, BR, CH, CH (European patent), DE, DE (Utility model), DE (European patent), DK, FI, FR (European patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SU, US.</p> <p>Published <i>With international search report.</i> <i>With amended claims.</i> <i>In English translation (filed in Swedish).</i></p> |

(54) Title: ARRANGEMENT FOR A SPRING FRACTURE SAFETY DEVICE FOR AN OVERHEAD SLIDING DOOR

(57) Abstract

An arrangement for a spring fracture safety device intended for a closing element for an overhead sliding door or similar capable of being moved between a raised and a lowered end position, which can be attached to a door actuating spring (1) and is controlled by tracks extending along the intended path of movement of the door, continuous guide rollers or similar control devices. The spring fracture safety device functions efficiently and reliably, irrespective of where along the length of the spring fracture occurs. One free end (1A) of the door actuation spring is capable of being attached via a movement transfer device (9) to a release device (7) for a door braking element (8) interacting with a number of said guide rollers, etc., which braking element can be caused to move between a position (I) in which it is ready for release and a braking position, in which positions the element (8) is respectively kept withdrawn, so that said guide rollers are able to pass freely along the tracks in question, and is caused to project, so as to produce a braking effect by interaction with a door guide roller.



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Arrangement for a spring fracture safety device for an overhead sliding door

The present invention relates to an arrangement
5 for a spring fracture safety device intended for a closing element
for an overhead sliding door or similar capable of being moved
between a raised and a lowered end position, which can be attached
to a door actuating spring and controlled by tracks extending
10 along the intended path of movement of the door, continuous guide
rollers or similar control devices.

The principal object of the present invention is,
in the first place, to make available an arrangement of the kind
indicated above, which is caused to function efficiently and
reliably in the event of spring fracture, irrespective of where
15 along the length of the spring fracture occurs.

Said object is achieved by means of an arrangement
in accordance with the present invention, which is characterized
essentially in that one free end of the actuating spring is
capable of being attached via a movement transfer device to a
20 release device for a door braking element interacting with a
number of said guide rollers, etc., which braking element can be
caused to move between a position in which it is ready for release
and a braking position, in which positions the element is
respectively kept withdrawn, so that said guide rollers are able
25 to pass freely along the tracks in question, and is caused to
project, so as to produce a braking effect by interaction with a
door guide roller.

The invention is described below as a preferred
illustrative embodiment, in conjunction with which reference is
30 made to the accompanying drawings, in which

Fig. 1 illustrates the invention applied to one
side of the track for an overhead sliding door and arranged in a
so-called "braking position";

Fig. 2 illustrates the spring fracture safety
35 device in an active braked position in which a door control roller
is being restrained;

Fig. 3 illustrates a part of the arrangement in a released, "braking position";

Fig. 4 illustrates said part in a so-called position in which it is ready for release;

5 Fig. 5 illustrates in perspective view a release device which is a constituent part of the arrangement in its position in which it is ready for release;

Fig. 6 illustrates the release device in a separated position and partially sectioned.

10 One free end 1A of a helical actuation spring 1, which may be supported by a number of holders 3 capable of being attached to the upper part of a door opening 2, and which is capable of being connected in a previously disclosed manner to a door panel 6 or similar closing element provided with a number of
15 guide rollers 5 or other similar guide devices running in guide tracks 4 extending along the lateral edges of the door opening, is capable of being attached to a release device 7 for a door braking element 8 interacting with a number of said guide rollers 5, etc., via a movement transfer device 9 conveniently in the form of a
20 cable. Said cable 9, which is preferably accommodated in such a way that it is protected inside a cable protector tube 10 extending between said end 1A of the spring and the door braking element 8, is connected by one of its ends 9A conveniently to a sleeve 11 threaded onto the end 1A of the spring, which sleeve
25 exhibits a hole 12 through which the end of the cable passes and is then attached to the cable 9 once more by means of a suitable attachment 13. Said end 1A of the spring conveniently extends directly outwards from the spring 1, more or less tangentially, and is capable of interacting with a stop 14 on the spring holder
30 3, which stop is so arranged normally as to function as a support for the end 1A of the spring when the spring 1 is held under tension during normal operation of the door and its spring 1. A recess 15, which matches the form of the end 1A of the spring, is conveniently provided in said stop 14 for the purpose of securely
35 retaining said end 1A of the spring and preventing the spring 1 from rotating when it is working and is placed under tension.

In order to prevent the end 1A of the spring from slipping off a sleeve-shaped holder part 16, onto which the spring 1 is wound, and which extends around a shaft 19 attached to, for example, a cable drum 18 connected to a door operating cable 17, to which shaft the other end of the spring is attached, it is secured to the holder part 16 by means of a clamp 20, which may be screwed securely thereto.

The door braking element 8 is so arranged as to be capable of being moved between a position I in which it is ready for release, as illustrated in Fig. 5, and in which position I the spring fracture safety device 21 is maintained in a readiness position in which the guide rollers 5 are able to pass freely along the track 4 in question in order to be capable of being released automatically in the event of fracture of the spring 1, and a braking position II, as illustrated in Figs. 1 and 2, and in which position II the door braking element 8 projects in front of a guide roller 5 of the kind in question in its intended path of movement 22, for example in the internal space 4A of the track, and which, to either side of the running surface of the guide roller, is defined by track surfaces 4B, 4C set transversely to one another, with which the running surface of the guide rollers can interact in order to achieve braking interaction with a door guide roller 5.

The door braking element 8 may consist of a brake block 23 which is provided with a number of brake heels 24 projecting in the same direction away from the block 23. Said brake block 23 is capable of being actuated in its position I in which it is ready for release by a number of release springs 25 executed from curved spring material, or is spring-actuated in some other way so as to be capable of being released, if necessary. Said release is prevented in said position I by means of the release device 7 consisting of a pin, for example, which is attached by its one end 7A to the end 9B of a cable, and the other end 7B of which is capable of being accommodated in a hole 26 in a tongue-shaped attachment 27 which projects in a direction away from the bottom 28A of a trough-shaped casing 28, inside the

internal cavity 29 of which the door braking element 8 is capable of being accommodated. The attachment 27 is so arranged as to be accommodated by a suitable opening 30 in the brake block 23. By pulling the cable 9 in the direction of the arrow 31, springs 25 of the kind in question will be permitted to push out the brake block 23 in the direction of the arrow 32, which, thanks to the presence of the cable end connection 1A, 9, 9A, 11, will occur at precisely the same moment as the fracture of the spring 1.

The springs 25 can be so arranged as to be capable of making contact respectively with the bottom 28A of the holder and with the rear surface 23A of the brake block, and may exhibit guide pins 33 projecting, for example, from their central part 25A and thus also from the bottom 28A of the casing, which guide pins are capable of being accommodated by suitable holes 34 in the brake blocks 23.

The casing 28, which can exhibit fastening devices 35 enabling it to be fastened to, for example, the outside or some other surface of a door guide track 4, as clearly shown in Figs. 1 and 2, also exhibits an elongated opening 36, for example, on one of its sides, so as to permit the cable 9 to be introduced as far as the intended connection with the attachment 27. Said springs 25 are accommodated in a space 28B formed between the bottom 28A of the casing and the brake block, whilst the brake block 23 and its brake heels 24 are kept fully retracted inside a space 28D defined by an opening edge 28C.

The brake heels 24 can exhibit a relieved section 37 so adapted as to be capable of accommodating a part of a guide roller, etc., of the kind in question, so as to function as a restraint for said guide roller 5 and conveniently also for a swinging roller holder 38 attached to the door element 6, which holder is described in more detail below.

The roller holder 38 consists of two swinging arms 39, 40 which are attached at one end 39A, 40A to a swinging axle 42 accommodated in a bearing 41 attached to the door panel 6, so as to be permitted to be pivoted about said bearing 41. At the opposite ends 39B, 40B of the swinging arms a tube 43 is securely

attached to the arms 39, 40, and a bearing shaft 44 for a door guide roller 5 is accommodated by said tube 43, as illustrated in Fig. 2. The swinging arms 39, 40 are attached by means of bolted connections 45 to a bearing plate 46, which is secured to the inside 6A of the door by means of screws 47, each of which bearing plates has its own flange 48, 49 projecting at right angles from the door panel 6. The bolts 45 are accommodated in curved openings 50 in the flanges and in holes 51 which extend through the swinging arms 39, 40. A suitable bearing component 52, which is accommodated by an adjacent section 6¹ of the door panel and which is attached to the shaft 42 by means of a tongue 53 containing a hole, enables a link to be provided between two sections 6¹, 6² of the door panel which are connected together.

In the event of the fracture of the spring 1 the straight end 1A of the spring leaves the stop 14 and rotates towards the clamp 20 in the direction of the arrow 54, as illustrated in Figs. 3 and 4. The cable 9 is pulled in the direction of the arrow 31 and causes the release pin 7 to be withdrawn from the hole 26 in the mounting 27, in so doing releasing the brake block 23 so that it can move outwards under spring pressure in the direction of the arrow 32. The brake heels 24 are thus caused to project through appropriate holes 55 in the wall 40 of the track and to adopt a position in the normal path of movement of the guide rollers. When a guide roller 5 reaches a brake heel 24, a part of the roller 5 engages in the relieved section 37, and the tube 43 conveniently engages in a nose-shaped part 56 of the respective brake heel 24. The effect of this is to brake the previously free falling movement of the door panel 6 towards the ground. The lower part 24A of the respective brake heel 24 comes into contact with the lower edge 57 of the through-hole 55. In the presence of a swinging roller holder 38 the roller 5 and the door panel 6 will move relative to one another viewed in the vertical sense, so that the door panel 6 is caused to be displaced in the direction of the arrow 58 towards an attachment profile 59 secured to the track 5 and its seal 61 supported by a profile section 60, once the bolted connection 45

has yielded and has permitted the rotational movement of the swinging arms 39, 40 in the direction of the arrow 62 about the link 40, 42. The effective braking of the door panel 6 is achieved in this way thanks to the present invention.

5 The safety device can be re-used after replacing the broken spring 1, once the constituent parts have been repositioned.

 The invention is not restricted to the illustrative embodiment described above and illustrated in the
10 drawings, but may be modified within the scope of the Patent Claims without departing from the idea of invention.

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P a t e n t C l a i m s

1. Arrangement for a spring fracture safety device intended for a closing element (6) for an overhead sliding door or similar capable of being moved between a raised and a lowered end position, which can be attached to a door actuating spring (1) and is controlled by tracks (4) extending along the intended path of movement of the door, continuous guide rollers (5) or similar control devices, characterized in that one free end (1A) of the door actuation spring is capable of being attached via a movement transfer device (9) to a release device (7) for a door braking element (8) interacting with a number of said guide rollers (5), etc., which braking element can be caused to move between a position (I) in which it is ready for release and a braking position (II), in which positions (I; II) the element (8) is respectively kept withdrawn, so that said guide rollers (5) are able to pass freely along the tracks (4) in question, and is caused to project, so as to produce a braking effect by interaction with a door guide roller (5).

2. Arrangement according to Patent Claim 1, characterized in that a cable (9) acting as a movement transfer device is secured to a straight section (1A) of the helical door actuation spring (1), conveniently to a sleeve (11) with a hole at its end threaded onto the end of the spring.

3. Arrangement according to Patent Claim 2, characterized in that said end (1A) of the spring is capable of interacting with a stop (14) acting as a support.

4. Arrangement according to any of the Patent Claims 2-3, characterized in that the door actuation spring (1) is secured by means of a clamp (20) to a holder component (16).

5. Arrangement according to any of the Patent Claims 2-4, characterized in that the cable (9) is accommodated in a cable protector tube (10) extending between said spring end (1A) and the door braking element (8).

6. Arrangement according to any of the Patent Claims 2-5, characterized in that the door braking element (8)

consists of a spring-actuated brake block (23) provided with a number of brake heels (24) and accommodated inside a casing (28) capable of being attached to the side of a track (4).

7. Arrangement according to Patent Claim 6, characterized in that the brake block (23) is capable of being controlled by means of control devices (33) projecting from the bottom (28A) of the casing, which control devices conveniently consist of a number of guide pins capable of being accommodated in holes (34) in the brake block (23).

8. Arrangement according to any of the Patent Claims 6-7, characterized in that a release spring (25), preferably made of curved spring material, is accommodated in a space (28B) between the bottom (28A) of the casing (28) and the brake block (23).

9. Arrangement according to any of the Patent Claims 6-8, characterized in that a brake heel (24) exhibits a relieved section (37) so arranged as to accommodate a part of a guide roller (5), etc., of the kind in question.

10. Arrangement according to Patent Claim 9, characterized in that brake heels (34) of the kind in question are so arranged as to function as restraints for swinging roller holders (38) attached to the door element (6).

11. Arrangement according to any of the Patent Claims 6-10, characterized in that the release device (7) for said door braking element consists of a pin attached to the movement transfer cable (9), which pin is so arranged as to be connected to a mounting (27) attached to the casing (28) in order to permit the brake block (23) to be restrained by force in its position (I) in which it is ready for release.

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AMENDED CLAIMS

[received by the International Bureau on 04 December 1987 (04.12.87);
original claims 1-11 replaced by new claims 1-10 (2 pages)]

1. Arrangement for a spring fracture safety device intended for a closing element (6) for an overhead sliding door or similar capable of being moved between a raised and a lowered end position, which can be attached to a door actuating spring (1) and is controlled by tracks (4) extending along the intended path of movement of the door, continuous guide rollers (5) or similar control devices, characterized in that one free end (1A) of the helical door actuation spring (1), the said end of which is capable of interacting with a stop (14) acting as a support, is secured to a cable (9) acting as a movement transfer device and which cable (9) being attached to a release device (7) for a door braking element (8) interacting with a number of said guide rollers (5), etc., which braking element can be caused to move between a position (I) in which it is ready for release and a braking position (II), in which positions (I; II) the element (8) is respectively kept withdrawn, so that said guide rollers (5) are able to pass freely along the tracks (4) in question, and is caused to project, so as to produce a braking effect by interaction with a door guide roller (5).
2. Arrangement according to Patent Claim 1, characterized in that a cable (9) acting as a movement transfer device is secured to a straight section (1A) of the actuation spring (1), conveniently to a sleeve (11) with a hole at its end threaded onto the end of the spring.
3. Arrangement according to any of the Patent Claims 1-2, characterized in that the door actuation spring (1) is secured by means of a clamp (20) to a holder component (16).
4. Arrangement according to any of the Patent Claims 1-3, characterized in that the cable (9) is accommodated in a cable protector tube (10) extending between said spring end (1A) and the door braking element (8).
5. Arrangement according to any of the Patent Claims 1-4, characterized in that the door braking element

(8) consists of a spring-actuated brake block (23) provided with a number of brake heels (24) and accommodated inside a casing (28) capable of being attached to the side of a track (4).

6. Arrangement according to Patent Claim 5, characterized in that the brake block (23) is capable of being controlled by means of control devices (33) projecting from the bottom (28A) of the casing, which control devices conveniently consist of a number of guide pins capable of being accommodated in holes (34) in the brake block (23).

10 7. Arrangement according to any of the Patent Claims 5-6, characterized in that a release spring (25), preferably made of curved spring material, is accommodated in a space (28B) between the bottom (28A) of the casing (28) and the brake block (23).

15 8. Arrangement according to any of the Patent Claims 5-7, characterized in that a brake heel (24) exhibits a relieved section (37) so arranged as to accommodate a part of a guide roller (5), etc., of the kind in question.

9. Arrangement according to Patent Claim 8, characterized in that brake heels (34) of the kind in question are so arranged as to function as restraints for swinging roller holders (38) attached to the door element (6).

20 10. Arrangement according to any of the Patent Claims 5-9, characterized in that the release device (7) for said door braking element consists of a pin attached to the movement transfer cable (9), which pin is so arranged as to be connected to a mounting (27) attached to the casing (28) in order to permit the brake block (23) to be restrained by force in its position (I) in which it is ready for release.

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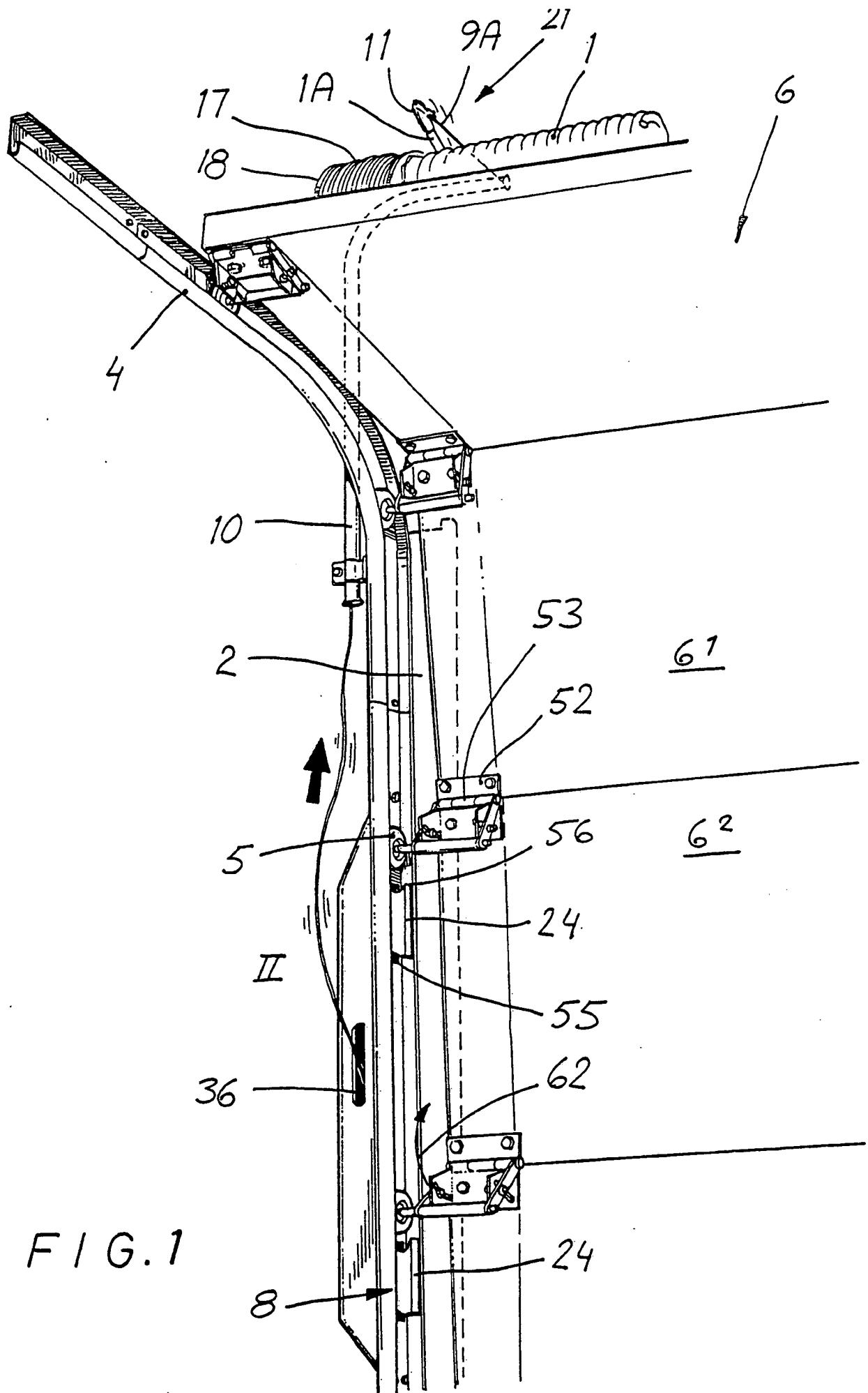


FIG. 1

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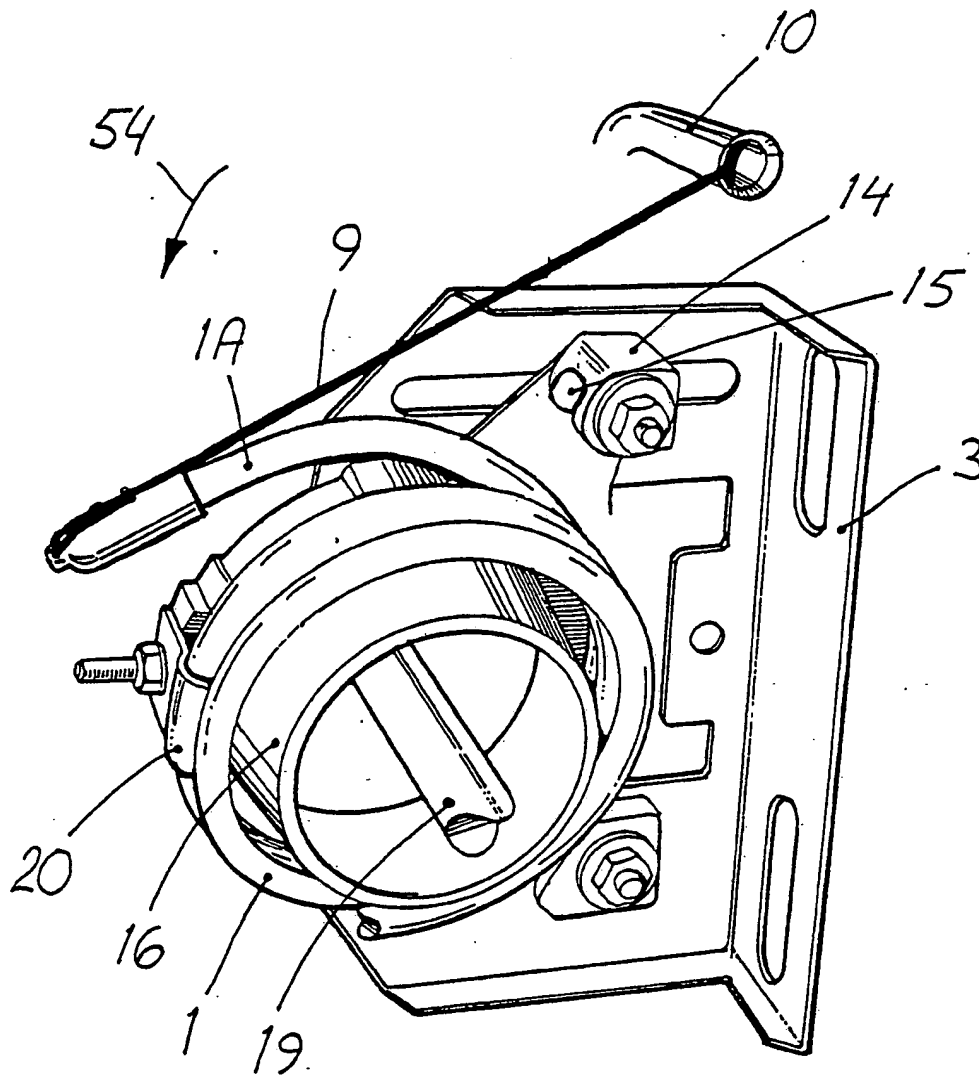


FIG. 3

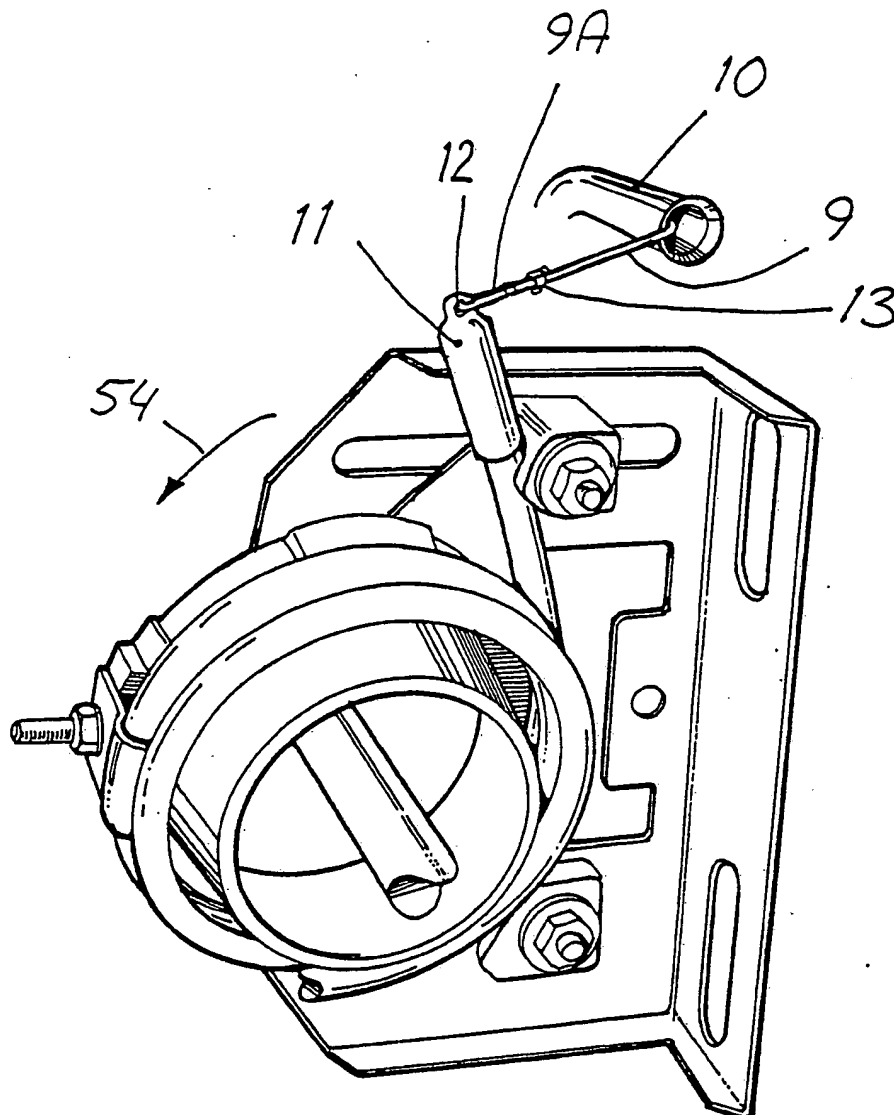


FIG. 4

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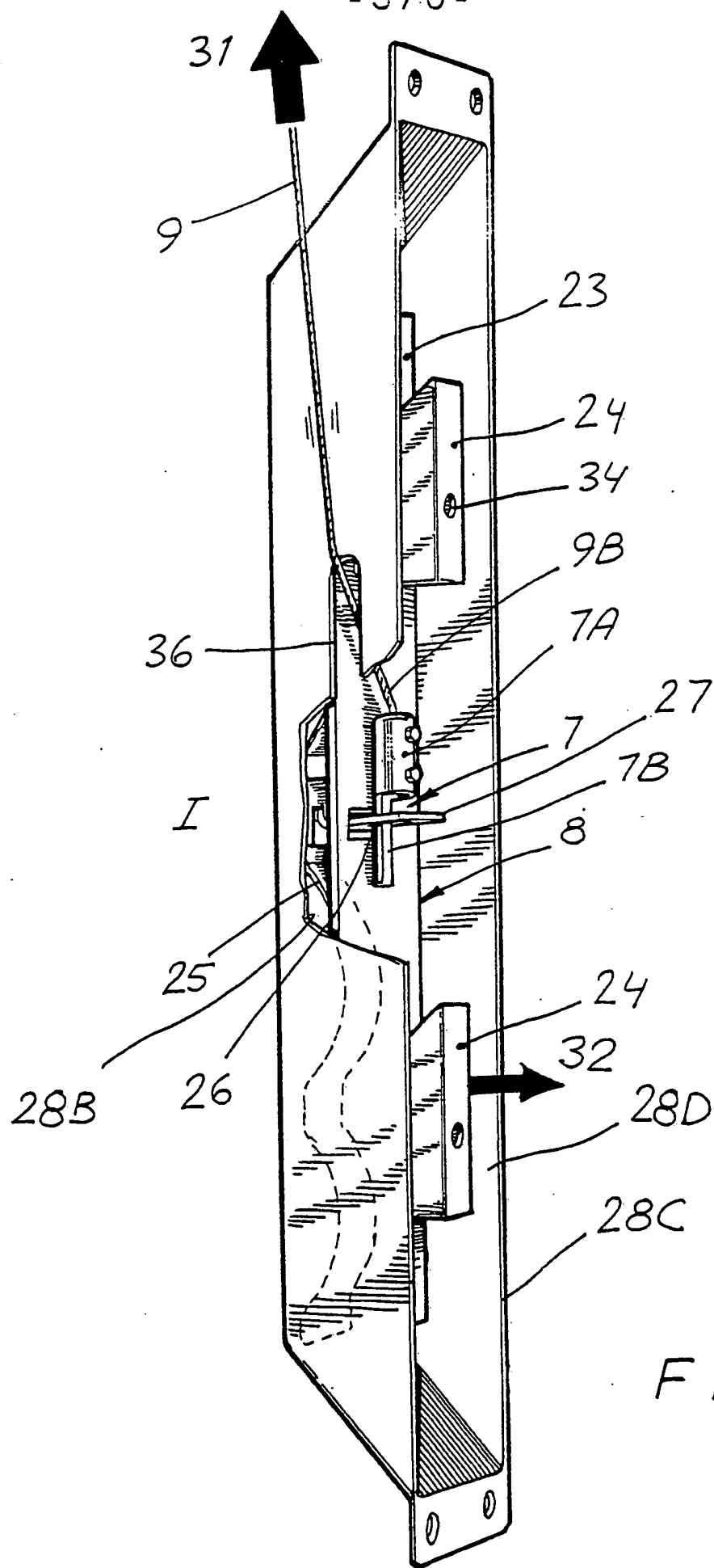
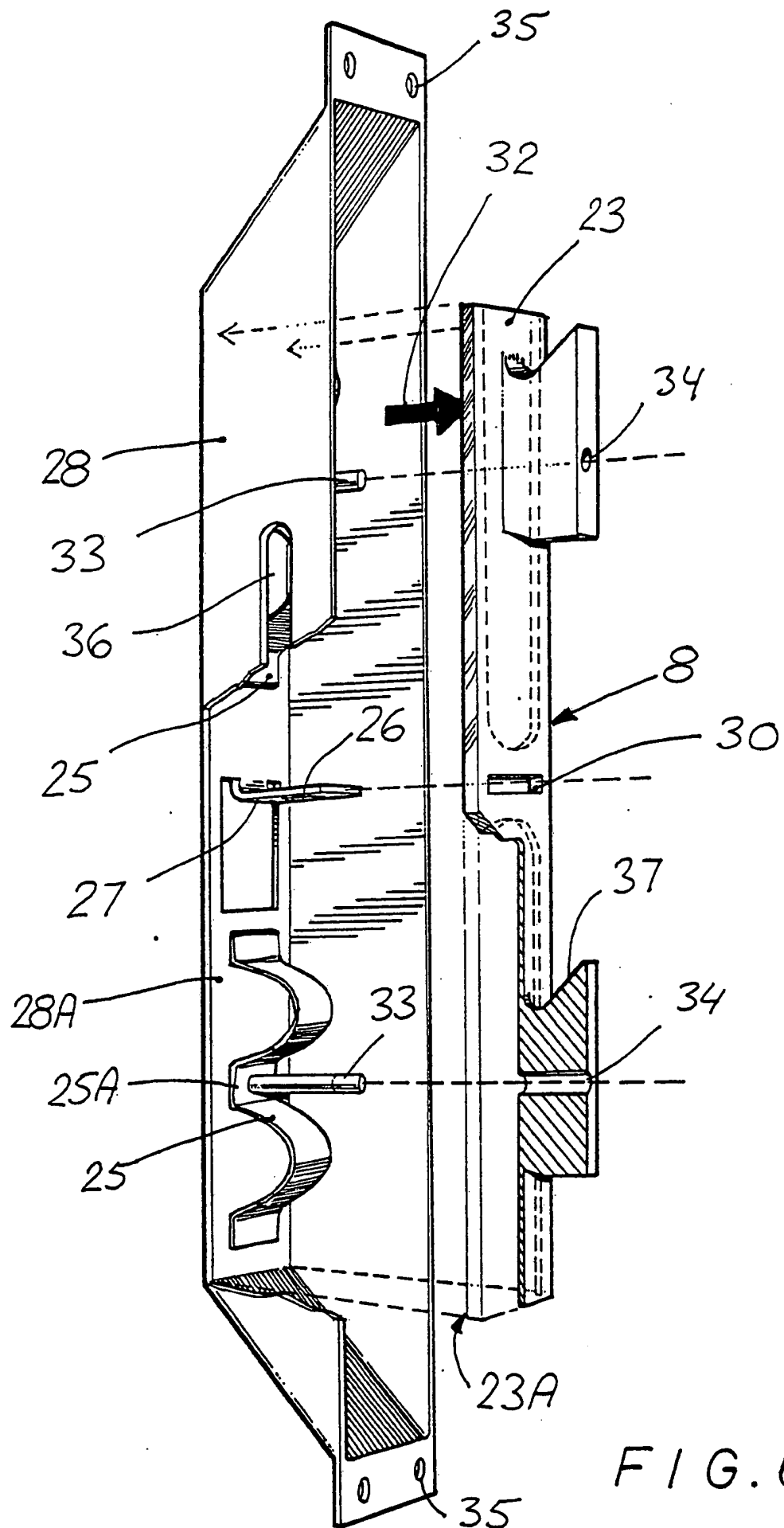


FIG. 5


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INTERNATIONAL SEARCH REPORT

International Application No

PCT/SE87/00351

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| I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ | | |
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| IPC ⁴ | E 05 D 13/00, 15/16-/24; E 05 F 15/00, /16, /20 | |
| Nat.C1 | 68: 18 | |
| US C1 | 160: 189-192 49: 322, 199-200 | |
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| P | DE, A1, 3 515 257 (ROLLWÄNDE- & JALOUSIENFABRIK C BEHRENS GmbH & Co) 6 November 1986 | |
| Y | DK, B, 150 622 (V KANN RASMUSSEN INDUSTRI A/S) 5 August 1986 | 1,5,6,7,8,10 |
| Y | EP, A3, 0 151 427 (HÖRMANN KG BROCKHAGEN) 14 August 1985 & DE, 3402343 & DE, 3425909 | 1,2,3,11 |
| Y | WO, A1, 85/01543 (CRAWFORD DOOR AB) 11 April 1985 & EP, 0188405 | 1,4,5,11 |
| Y | US, A, 3 258 062 (LAMBERT) 28 June 1966 | 1,9 |
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